

## REMARKS

Currently, claims 1-5 and 11 are presented for examination in the present application. Claim 11 has been allowed and will not be discussed further hereinafter. Claims 1-5 have been rejected as being unpatentable over US 6,211,635 to Kambe et al. in view of US 6,256,181 to Chinomi et al. The Examiner's rejections are traversed for the following reasons.

The present invention is directed toward a drive unit for a brushless fan motor that is adapted to control the actual rotational speed of the rotor to match a target rotational speed of the rotor. The inventive drive unit includes a power control circuit that controls the on/off operation of a power feed semiconductor switch. In the present invention, after the speed of the rotor is stabilized, the power feed semiconductor switch may have a turn-off time set shorter when the actual rotational speed (i.e., sensed rotor rotational speed) is slower when compared to the target rotational speed. Similarly, the power feed semiconductor switch will have a turn-off time set longer when the actual rotational speed (i.e., sensed rotor rotational speed) is faster than the target rotational speed. Finally, the turn-off time of the power feed semiconductor switch will be unchanged when the actual rotational speed of the rotor matches the target rotational speed.

Kambe et al. shows a method to solve problems with an outdoor fan motor of an air conditioner that arises in starting the motor, which is already rotating by means of natural wind. In Kambe, the fan motor is started with ON-OFF control using a specified conduction pattern, by synchronizing the switching elements of the inverter circuit with the output signal from the Hall probe, which detects the rotational position of the rotor rotating by means of natural wind. Specifically, before starting

the motor, the control means controls the switching elements to supply DC PWM-controlled current to the stator coils of the motor in synchronization with the output signal of the Hall probe, so that the rotor is braked, stopped, and set to the home position. It is noted that Kambe et al. is directed toward solving problems inherent in outdoor fans, and specifically start-up problems associated with such fans. It is further noted that Kambe is not concerned with problems associated with controlling rotor speed following stabilization of the rotor (i.e., steady state problems following startup).

With reference to the Examiner's comments in the Office action, it is noted that Kambe (Col. 1, line 66 to Col. 2, line 10) does not teach "the power control circuit controlling the on/off operation based on a target rotational speed of the rotor", but rather teaches a method for braking the rotor prior to start-up. (In this regard it is noted that the portion of the claimed invention that the Examiner refers to is directed toward controlling the rotor after the rotor speed is stabilized, which is surely not the case in Kambe pre-startup). Similarly, the Examiner's reference to Kambe at Col. 5, line 60 to Col. 6, line 16 is not relevant to the claimed invention. This portion of Kambe again describes a method for braking the rotor prior to start-up and is, therefore, irrelevant to the claimed invention that is directed toward rotor speed control following attainment of a stabilized rotor speed. In this regard, it is further unclear how the Examiner can conclude that Kambe teaches a power feed semiconductor switch that has a variable turn-off time (based upon the comparison of actual rotor speed with target rotational speed) while the Examiner admits (second paragraph of page 3) that Kambe does not teach a rotational speed detection means. If the Examiner intends to maintain this rejection, clarification of this point is requested.

Therefore, Kambe does not shown any configuration of a power control circuit as defined in claim 1 of the present application. The Examiner has recognized this deficiency of the Kambe reference, and has instead relied upon Chinomi et al. as teaching this structure.

However, Chinomi et al. also shows a method to solve problems with an outdoor fan motor that arise in starting a motor that is already rotating by means of natural wind. Chinomi discloses a device in which the drive circuit prohibits driving of the fan motor when the motor speed is detected to exceed a specific threshold value before the motor is started. Chinomi shows a method to determine whether the motor should be started based upon the detected rotational speed of the rotor at the startup time. Chinomi, like Kambe, is directed toward solving start-up problems associated with outdoor fans, and is unrelated to solving the steady-state problems encountered and solved in the present invention.

Therefore, it is considered clear that Chinomi does not show any configuration of a power control circuit as defined in claim 1 of the present application. For example, Chinomi does not teach or suggest:

a power control circuit for outputting a control signal *which acts to control the on/off operation of said power feed semiconductor switch*, thereby controlling the rotational speed of said rotor;

said power control circuit *controlling the on/off operation of said power feed semiconductor switch* based on a value of the target rotational speed of said rotor given as a speed command and an actual rotational speed obtained by said rotational speed detecting means;

said power control circuit being constructed so that *after the rotational speed of said rotor is stabilized, said power feed semiconductor switch may have turn-off time set shorter when an actual rotational speed is slower, in comparison, than said target rotational speed, and set longer when the actual rotational speed is faster than said target rotational speed, and set as it is when an actual rotational speed is substantially equal to said target rotational speed.* (emphasis added)

Rather, the Chinomi reference merely teaches a device and method to assist in start up when the rotor is already rotating due to environmental influences. More specifically, Chinomi teaches a circuit that will prevent driving of the motor when the rotor is already rotating. This is unrelated to the presently claimed invention, which is concerned with controlling the speed of the rotor during operation, i.e., after the rotational speed of the rotor is stabilized (compared to a sensed speed). It is respectfully submitted that the teachings of the cited Chinomi and Kambe references as they relate solely to start-up involving already-rotating rotors, is unrelated to the present invention defined by claim 1, which is related to controlling the rotor speed during normal operation.

Moreover, it is respectfully submitted that the portion of Chinomi (Col. 2, lines 37-67) relied upon by the Examiner for teaching the "power control circuit" does not teach that for which it is cited. This cited portion of Chinomi has been read several times, and cannot be interpreted as teaching a "power feed semiconductor switch may have turn-off time set shorter when the rotational speed is slower and the target rotational speed is set longer when the actual rotational speed is faster than the rotational target speed". The Examiner is asked to clarify her interpretation of this portion of Chinomi et al.

For at least the foregoing reasons, it is respectfully submitted that claim 1 is not obvious in light of the Examiner's proposed combination of references. The references cited by the Examiner do not teach that for which they are cited. Moreover, even if the references are combined as advocated by the Examiner, the present invention, as defined in claim 1, will not result. Rather, further modification of the combination will be required to arrive at the claimed invention.

Claims 2-5 introduce further novel and non-obvious features of the present

invention, and are likewise allowable over the art of record.

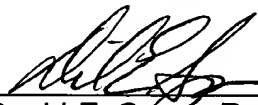
In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. NIS-12689.

Respectfully submitted,

RANKIN, HILL, PORTER & CLARK LLP

By

  
\_\_\_\_\_  
David E. Spaw, Reg. No. 34732

700 Huntington Building  
925 Euclid Avenue  
Cleveland, Ohio 44115-1405  
(216) 566-9700  
Customer No. 007609